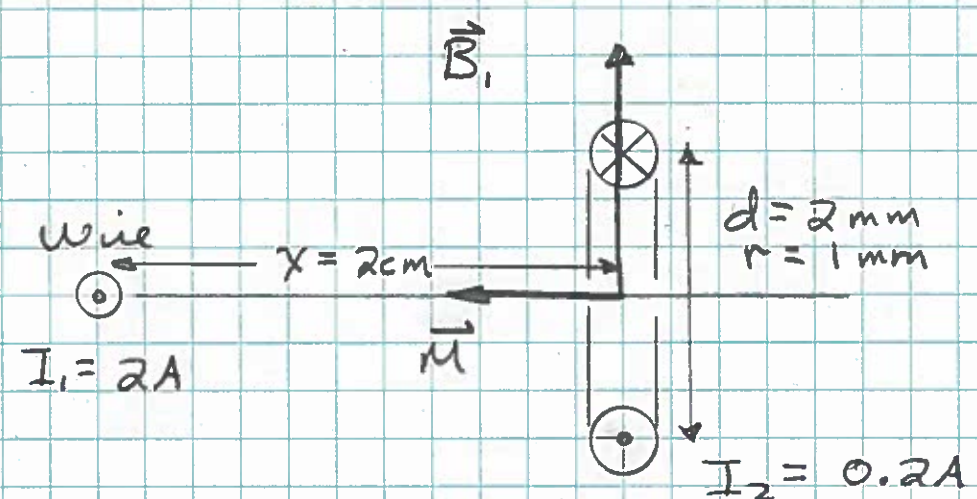

a.)

Wire creates field $\vec{B}_1 = \left(\frac{\mu_0 I_1}{2\pi x}, \text{up}\right)$

Dipole moment of loop: $\vec{\mu} = (I_2 A, \text{left})$

$$\mu = I_2 A = I_2 \pi r^2 = 6.283 \times 10^{-7}\ T m^2$$

$$\vec{\tau} = \vec{\mu} \times \vec{B}_1 \Rightarrow |\vec{\tau}| = \mu B_1 \sin 90^\circ = \mu B_1$$

$$= \frac{\mu \mu_0 I_1}{2\pi x} = \underline{1.257 \times 10^{-11}\ N m}$$

RHR $\Rightarrow$ $\vec{\tau}$ is into page and causes a <u>CW rotation</u>

b.) The equilibrium position is for $\theta = 0^\circ$ or 180°; i.e. $\pm 90^\circ$ from sketch